**Focal, Local, and Global Dimensions of Engineering Practice**

**Gene Moriarty**

**Department of Electrical Engineering**

**San Jose State University**

**USA**

**justus@cruzio.com**

**Abstract**

The principle aim of this essay is to show the contribution of Focal Engineering to the global development of engineering practice. Focal Engineering, recently advocated as an alternative to standard, contemporary engineering practice, is a type of focal practice. Engineering process becomes focal practice and engineered product becomes focal thing. Focal practices and focal things exhibit, according to philosopher of technology Albert Borgmann, a *commanding* reality which counters the *disposable* reality produced by standard engineering practice. Focal Engineering seeks to develop focal products. These are products that are disburdening but also engaging, enlivening, and resonant. This is in opposition to standard engineering which yields devices that are disburdening but also tend to be disengaging.

Standard engineering, unlike focal engineering with its local flavor, distributes engineering tasks into the global arena and coupled with reduction of international trade barriers has been a tremendous boost to emerging economies. Though standard engineering is already largely globalized, Focal Engineering is just beginning to look in that direction. At least initially, Focal Engineering is local engineering. It begins with people getting together in places like libraries, churches, hospitals, and meeting halls. Conversations are paramount. Should we install another stop sign on this corner? What kind of shielding do these antennas need in order to keep our citizens safe? Should we ban Genetically Modified foods from our community? What kind of engineered products do we need and choose to develop? At least initially, we think locally and act locally. The Transitions Movement is another community practice that thinks and acts locally, that resonates with and informs (or can inform) the initial stages of Focal Engineering practice.

Focal Engineering, however, need not stay with only a local perspective. There can be a certain extension, a kind of viral effect, which moves out from a local emplacement to a global involvement. This movement stimulates globalism not globalization. Though these terms often tend to be conflated, we will follow the distinction provided by Mark Ritchie. He maintains the key aspect of globalization is that it is an economic process. Money, products, and factories get moved around the planet by corporate powers at increasing rates of speed, always in search of cheaper labor, cheaper raw materials, and weak labor, consumer, and environmental protection laws. Coupled with the dynamics of globalization is the idea that we will all be better off if global markets are “left unfettered by ethical, moral, social, or environmental considerations.” Ritchie views globalism, on the other hand, as the idea that we share a fragile planet which requires mutual respect and careful treatment of all its inhabitants and its environment. In addition, globalism requires the daily active practice of a set of values and ethical beliefs. "Active communications to foster understanding, the sharing of resources on the basis of equity and sustainability, and mutual aid in times of need are three central activities that undergird globalism.”

Standard contemporary engineering advances globalization while Focal Engineering advances globalism. Our contention is that a balance needs to be attainted, and then maintained, between these two advancements. Since globalization has been emphasized in the past few decades, now is the time to push the idea of globalism onto center stage so that a balance becomes possible, becomes at least a topic of conversation.

**1. Introduction**

Engineering serves the global process by bringing into its flows a wealth of engineered products (systems, structures, devices, tools, utensils, networks, services, etc.) Engineering has a hand in virtually every aspect of the contemporary global process. But a hand may not be enough. We perhaps need – as the 4-H Club suggests – head, heart, and health as well as hand. For engineering to make a healthy contribution to the global process, a distinction between two types of engineering might prove useful. Wikipedia defines engineering as “the discipline, art, skill and profession of acquiring and applying scientific, mathematical, economic, social, and practical knowledge to design and build structures, machines, devices, systems, materials and processes that safely realize improvements to the lives of people.” Such a definition is incontrovertible. I will call this kind of engineering *Standard Engineering*. It stresses hand and head. Epistemologically it employs know-how and know-what. Contrasted to Standard Engineering I propose *Focal Engineering*. It stresses heart as well as hand and head. Epistemologically it employs know-why as well as know-how and know-what. *Focal Engineering* is a holistic, empathic, and humanistic kind of engineering which typically begins in local conversations but can reach out to the global arena.

Parallel to the distinction between standard and focal engineering, within the global arena, I will distinguish between globalization and globalism. Wikipedia describes globalization as the process by which regional economies, societies, and cultures have become integrated through a global network of political ideas through communication, transportation, and trade. The term is most closely associated with the term economic globalization: the integration of national economies into the international economy through trade, foreign direct investment, capital flows, migration, the spread of technology and military presence. Most simply, globalization is just capitalism writ large. However, globalization is usually recognized as being driven by a combination of not only economic factors but also technological, sociological, political, and biological factors. The term can also refer to the transnational circulation of ideas, languages, or popular culture through acculturation. An aspect of the world which has gone through the process can be said to be globalized.

Wikipedia describes globalism as having at least two different and opposing meanings. One meaning is the attitude or policy of placing the interests of the entire world above those of individual nations. Another is viewing the entire world as a proper sphere for one nation to project political influence. American political scientist Joseph Nye1 argues that globalism refers to any description and explanation of a world which is characterized by networks of connections that span multi-continental distances; while globalization refers to the increase or decline in the degree of globalism.

I find the definitions of globalization and especially globalism to be a bit confusing. In what follows I will try to bring some clarity to the discussion and simultaneously investigate more deeply the role engineering is playing and perhaps ought to play in the global arena. The word “ought” brings up the notion of ethics. Thus, along with the standard engineering/focal engineering distinction, I bring into the discussion a perspective on the type of ethics appropriate to standard engineering and the type appropriate to focal engineering. The already networked world of globalization calls for standard engineering practice which in turn recalls a kind of Technological Determinism. Focal engineering serves globalism which is brought into being by a kind of Social Constructionism. The well-worn distinction between Technological Determinism and Social Constructionism plays a not insignificant role in the project to untangle the relationship between globalization and globalism.

**2. Globalization Versus Globalism**

Or is versus really the right word here? Are these two phenomena at odds? Or are they complementary? I see the relationship of globalization to globalism through the metaphor of Yin/Yang. Globalization is the Yang side: masculine, competitive, aggressive, self-assertive. Globalism is the Yin side: feminine, co-operative, integrative, empathic. They are integral parts of a global constellation. Their relationship needs to be balanced. They need each other. As poet Wallace Stevens puts it:

Two things of opposite natures seem to depend

On one another, as a man depends

On a woman, day on night, the imagined

On the real. This is the origin of change.

Winter and spring, cold copulars, embrace

And forth the particulars of rapture come.2

The problem in contemporary times is the existing stress on globalization and the miniscule amount of attention given to globalism. Often, globalization and globalism are conflated. In the present paper I will distinguish between them, explore their meanings, and pursue a more harmonious balance of the two. Only on the basis of such a balance might we come to an appreciation of the above-mentioned “particulars of rapture.”

To begin, I propose to re-visit the definitions of globalization and globalism mentioned in the Introduction. The Global Constellation in its own right is a monumental mechanism spanning economic, cultural, and political systems. Douglas Kellner: “A wide and diverse range of social theorists are arguing that today’s world is organized by increasing globalization, which is strengthening the dominance of a world capitalist economic system, supplanting the primacy of the nation state by transnational corporations, and eroding local cultures and traditions through a global culture.”3 Does globalization yield increasing homogeneity or does it produce heterogeneity through increased hybridization? There is a growing contingency that believes there is a dangerous, unsustainable, and unethical way that economic globalization is being accomplished. Corrupt government officials are giving away power to large corporations for their own personal gain: human rights/environment/health/economy/democracy all are at risk. Eternal and, yes, global vigilance is becoming the price of liberty.

The globalization side of the global constellation gets positive and negative assessments. Lucky O.Imade: “Globalization is certainly the buzzword of the new millennium. The nature and impact of globalization has been the subject of profound debate and concern in economic circles since the mid-1990s.”4 Will unfettered global market forces increase or diminish the gap between the rich and the poor? Proponents of globalization insist “it has promoted information exchange, led to a greater understanding of other cultures, raised living standards, increased purchasing power (most especially in the west) and allowed democracy to triumph over communism.”5

Opponents insist that globalization is merely the process of corporations moving their money, factories and products around the planet at ever more rapid rates of speed in search of cheaper labor and raw materials and governments willing to ignore or abandon consumer, labor and environmental protection laws. As an ideology, it is largely unfettered by ethical or moral considerations.

Mark Ritchie sees globalism as the belief that we share one fragile planet the survival of which requires mutual respect and “careful treatment of the earth and its people. Globalism, like all values and ethical beliefs, requires active practice in our day-to-day lives. Communications to foster understanding, sharing of needed resources on the basis of equity and sustainability, and mutual aid in times of need are three central features of activities that undergird globalism.”6

From all the above we can see globalism as tending toward empathy and globalization as tending toward self-assertion. Arthur Koestler uses the Roman god Janus to represent this distinction in the human constitution. Janus is the two-faced god, the god of thresholds. The self-assertive side of us is looking into the room, concerned for our own interests, while the integrative side of us is looking outwards, acknowledging our already interconnected human character. As it is with the human person so also it is with the groups to which humans belong: family, neighborhood, city, state, country, world.

Even though we have historically, at least since the dawn of modernism, leaned toward the self-assertive side, Jeremy Rifkin in his new book *The Empathic Civilization*7 indicates that we humans do in fact have an empathic side, which even science is now admitting, and this discovery is challenging the whole Darwinian survival of the fittest world-view. Our empathic side is integrative and thrives on communication and sharing and being-for the other in our world gone global. Rifkin envisions a utopian ethos where the whole world is subsumed under the umbrella of the empathic civilization. Before that occurs, however, it would be essential to see at least a balance between globalization and globalism.

**3. Standard Engineering and Focal Engineering**

Albert Borgmann in his book *Crossing the Postmodern Divide8* indicates two paths we can take as we move across the postmodern divide separating the modern era from the postmodern era. Although it is really impossible to pinpoint where and when we as a civilization have crossed, or are crossing, or will cross that divide, at least we can distinguish the modern from postmodern eras. And what is the nature of the two possible paths characterizing the postmodern era? In particular, what is the nature of engineering as we cross the postmodern divide? One path is just a continuation of business as usual, except at an intensified and accelerated level. Borgmann calls that hyper-modernism. The other path, more human and engaging, he calls the path of postmodern realism.

Several values characterize modernism, among them aggressiveness toward nature, the triumph of a universal method (Descartes’), and a stress on the individual. As we move on into the postmodern era, these values shift toward more sensitivity toward the environment, a greater concern for the particular rather than the general, and a new emphasis on community rather than on the individual. The shift in environmental attitude is probably most apparent, from Francis Bacon’s view of nature as a phenomenon meant to be subdued for the benefit of humans, up to contemporary times when we are seen as part of nature, one with nature, and our engineered world needs to be resonant with nature. Hence the rise in significance of the value of environmental sustainability.

Engineering in the modern era I am calling standard engineering. As it crosses the postmodern divide, engineering becomes either hyper-modern engineering, which is standard modern engineering amplified and intensified, or a kind of engineering characterized by postmodern realism, which I am calling focal engineering.9 Focal engineering engineers focal products which are products that are engaging, enlivening, and resonant. Focal engineering asks “why” questions. It follows the Precautionary Principle. It seeks to bring forth products that exhibit a commanding reality instead of a disposable reality. It is concerned not just with the end-user and the product, but also with the world or the context out of which the product emerges and into which it coalesces. That world is the human lifeworld in which humans embrace a multiplicity of goals and enact a variety of roles and take up with all sorts of devices and things. Focal engineering, depending on head, heart, and hand in a healthy manner, relies crucially on conversations. By having honest, open, non-coercive conversations in the lifeworld, engineers and all interested parties can have it out and hopefully arrive at some kind of consensus.

Hyper-modern standard engineering is a form of postmodern engineering practice and is inherently global. For example, resources are gathered from Peru. Designs are concocted in Germany. Proto-types are constructed in Australia. Testing is done in Maylasia. Construction is done in Mexico. The designed devices are marketed across the globe. The result of all this is that every person or perhaps more realistically every other person has an i-POD in their pocket.

Focal engineering is most often initially a local venture. At least initially, focal engineering is local engineering. It begins with people getting together in places like libraries, churches, hospitals, and meeting halls. Conversations are paramount. Should we install another stop sign on this corner? What kind of shielding do these antennas need in order to keep our citizens safe? Should we ban Genetically Modified foods from our community? What kind of engineered products do we need and choose to develop? Initially, we think locally and act locally.

The Transitions Movement or Initiative is another community practice that thinks and acts locally, that resonates with and informs (or can inform) the initial stages of focal engineering practice. Its purpose “is to address, at the community level, the twin issues of climate change and peak oil.”10 How do we transition away from fossil fuels? For instance, engineer affordable solar panels, first for my house, then yours, then for the entire community. “Starting with a steering group of just a handful of people in one locality, the motivation to become a Transition community spreads, often through many months of preparation, information-giving, and awareness-raising of the issues of climate change and peak oil. In those months, there are talks and film screenings, and a deliberate attempt to encourage a sense of a community’s resilience in the face of stresses.” 11

The idea of community has always been with us and has been part of our social evolution and has dwelt deep in our hearts, “an archived treasure” as Jay Griffiths calls it. It consists of the knowledge of what being a member of a community is like, “via extended families, locality, village, a shared fidelity to common land, unions, faith communities, language communities, co-operatives, gay communities, even virtual communities, which, for all their unreality, still reflect a yearning for a wider home for the collective soul.”12 But the Transitions Initiative itself, starting in the small town of Totnes in Devon, England in 2006, has in a sense gone global and has expanded its reach to the US, Canada, Japan, and practically all around the globe.

Focal engineering itself is potentially global, especially in these days of electronic communication. It can go viral and spread across the globe, although to remain focal, its products must remain engaging, enlivening, and resonant. For example, Roger Linn has engineered a new musical instrument he designed. It uses a multi-touch pressure sensitive control surface which is a 7x12 grid. Each key has three degrees of control involving pressure, pitch, and timbre. The musician can play chords on it and the intriguing resulting sound is somewhat like a cross between a guitar and an organ. At his website Mr. Linn has had (as of May 1, 2011) 245,653 hits on his short 2.5 minute video demonstrating the instrument. There is possibly already a global interest in his instrument. Musicians seem thrilled at the prospect of using them and would no doubt find them to be highly engaging, enlivening, and resonant. They communicate with their friends around the world and almost over-night the new instrument could possibly become a global sensation. Such a product, a focal product, serves globalism rather than globalization. Communications foster understanding in that the understanding, which was at first local and limited, blossomed into a viral and global phenomenon, thanks to electronic communications media. Globalism, in addition, promotes empathy, the sharing and caring attitudes that musicians in general have for each other as they take up with a new instrument and experiment with its possibilities.

To make the globalization/globalism distinction more clear in this example we can invoke the distinction between *Gesellschaft* and *Gemeinschaft* suggested byFerdinand Tönnies*.* The community served by globalization is the Gesellschaft and the community served by globalism is the Gemeinschaft. Within these communities people are together, belong together. But in the Gesellschaft they do so based on functionality and practicality. In the Gemeinschaft they do so based empathy and intimacy. As Heidegger would put it, in the Gesellschaft they belong together with an emphasis on the “together,” and in the Gemeinschaft they belong together with an emphasis on the “belonging.” The type of community of musicians referred to in the above example would be, in most cases, a Gemeinschaft.

**4. Other Takes**

A slightly different way to look at the globalization/globalism constellation is to see the separate terms under a distinction drawn from the ancient Greeks, the *praxis/theoria* distinction. Globalization is a process, the *praxis*, a concrete and practical enterprise, an on-going dynamic process of expansion and contraction of actual flows of information, energy, labor, capital, and commodities. Globalism, on the other hand, is the conceptual framework, the *theoria*, which seeks to describe and explain the underlying network of globalization and possible globalizations. As Muqtedar Khan puts it: “faith and interest in globalism drives globalization – and, in turn, globalization spreads globalism.”13 Ideas drive the process and the process spreads the ideas.

M. Papastephanou sees globalization as the object of the conceptualizations of globalism: “the facticity of globalization is one thing but the thematization of this facticity is quite another.”14 She also sees globalization in a way that is essentially deterministic. It is not something we can do anything about. It befalls us. It is happening to us. Like the way the radio-activity is spreading across the globe from the Fukushima nuclear reactor disaster in Japan. Although globalization is apparently determined, globalism is not and is in fact constructed. That’s why we can reflect, thematize, conceptualize, and analyze and thereby learn from our mistakes, learn how to do better the next time. The seemingly determined reality, then, of the globalization *praxis* is not really the case. It is thematized and socially conditioned by the *theoria* of the forces of globalism.

We have then two different realms of discourse. Globalization is an action oriented realm. Globalism is more reflective. The latter is not better than the former, nor worse than it. The standard engineering project serves the flows of politics, economics, information, and culture that constitute the essence of globalization. Cell phones, cars, laptops, etc. are products that lift the burdens of time and space. They may entertain and educate as well. By following values like health & safety, environmental sustainability, and social justice, the products of standard engineering seek to at least do no harm in the globalized world. Generally speaking, the realm of globalization is well served by the standard engineering project.

Globalism is the more transcendental realm of discourse. It is served by focal engineering which has a lot in common with standard engineering. But the ways in which it is different are what make it noteworthy. As mentioned earlier, focal engineering asks why questions, it brings context to bear on its assessments, it seeks to bring into being focal products that have a commanding rather than disposable reality. Focal engineering serves Gemeinschaft communities under globalism’s sway rather than globalized Gesellschaft communities. The ethics of globalism includes the ethics of globalization and standard engineering practice. That is, it follows values like health & safety, environmental sustainability, and social justice, but other things as well. The ethics of globalism also seeks products and practices that are engaging, enlivening, and resonant. Conversation, the conversation of the lifeworld, is necessary for determining whether or not a given product is or can be focal.

Again, I wish to dispel the idea that the realm of globalism is somehow higher and thus better than the more concrete realm of globalization. Plato had his realm of ideas wherein globalism would have been at home. For Plato it had priority, it held sway over the everyday world of praxis because it was the realm of True Being. But a couple of millennia later, Nietzsche completely reversed that and had the concrete realm of tangible praxis as holding sway over the abstract conceptual realm of ideas. Priority of one realm over another is not the issue here. The issue is the imbalance between globalism and globalization. The latter has been stressed and a new emphasis needs to be put on globalism.

**5. Conclusions**

Standard and focal engineering are shown to be two types of engineering intrinsic to the postmodern era. Also we deconstruct the global constellation into globalization, the aggressive yang side of that constellation, and globalism, the integrative yin side of it. Standard engineering serves the processes of globalization and their resulting Gesellschafts, whereas focal engineering serves the processes of globalism and their resulting Gemeinschafts. In our current contemporary era an imbalance has emerged: the processes of globalization have received most of the attention of the doers and thinkers involved in this global venture. It is time to push into the lime-light the small but significant voice of globalism and the service to it by the focal engineering project thereby restoring a balance we have long lived without.

A few final summary thoughts: globalization believes in the primacy of private property; globalism recognizes the primacy of the commons. With globalization, capital dictates policy; with globalism, ethics and empathy trump capital and guide policy. Globalization must always maximize return on investment; globalism seeks to optimize return on investment. Globalization sees the planet as a resource base; globalism sees the planet as a home. Globalization says the rising tide lifts all boats; globalism knows the rising tide will flood the coastal cities and plains and the world’s islands. (This paragraph is thanks to my colleague R. Alan Gladstone)

I tend to agree with Marshall Brown’s take on all this so I give him the last word. Globalism for Brown is “an idea, an image, a potential.” And by globalization he understands “a process, a material phenomenon, a destiny. Not everyone will accede to this usage. But whatever else emerges [from the discourse surrounding the globalization/globalism constellation] a prime motive throughout lies in the complex countercurrents of globalisms or globalizations near and far, past, present, and future. Globalism and globalization are things that we all desire and resist, create and succumb to, in the vast crowded, sometimes inhospitable world we call home.”15

**References**

1. [Joseph Nye](http://en.wikipedia.org/wiki/Joseph_Nye), "Globalism Versus Globalization" at the website <http://www.theglobalist.com/StoryId.aspx?StoryId=2392>
2. Wallace Stevens, *The Palm at the End of the Mind*, from the Poem “Notes Toward a Supreme Fiction,” Vintage Books, New York, 1972, p. 218.
3. Douglas Kellner, ”Globalization and the Postmodern Turn,” at the website <http://gseis.ucla.edu/faculty/kellner/essays/globalizationpostmodernturn.pdf> p. 1.
4. Lucky O. Imade, “The Two Faces of Globalization: Impoverishment or Prosperity?,” at the website <http://globalization.icaap.org/content/v3.1/01_imade.html> p. 1.
5. Ibid., p. 1.
6. Mark Ritchie, “Globalization vs. Globalism: Giving Internationalism a Bad Name,” at the website <http://www.hartford-hwp.com/archives/25a/069.html> Jan. 1996, p. 2.
7. Jeremy Rifkin, *The Empathic Civilization: The Race to Global Consciousness in a World in Crisis,* Tarcher, New York, 2009.
8. Albert Borgmann, *Crossing the Postmodern Divide*, University of Chicago Press, Chicago, 1993.
9. Gene Moriarty, *The Engineering Project: Its Nature, Ethics, and Promise*, Penn State University Press, 2008.
10. Jay Griffiths, ”The Transition Initiative,” *Orion Magazine*, at the website <http://www.orionmagazine.org/index.php/articles/article/4792> July/August 2009, p. 1.
11. Ibid., p .2.
12. Ibid., pp. 3-4.
13. Muqtedar Khan, “Teaching Globalization,” *The Globalist*, at the website <http://www.theglobalist.com/StoryId.aspx?StoryId=3385> August 28, 2003, p. 3.
14. Marianna Papastephanou, “Globalisation, Globalism and Cosmopolitanism as an Educational Ideal,” *Educational Philosophy and Theory*, vol. 37, no. 4, 2005, p. 535.
15. Marshall Brown, “Globalism or Globalization?,” *Modern Language Quarterly*, vol.68, no. 2, June 2007, p. 143.

#